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EXAMINER	
YE, LIN	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/909,528	Applicant(s) BIDERMANN ET AL.
	Examiner Lin Ye	Art Unit 2615

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figures 1-5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 18 is objected to because of the following informalities:

For claim 18, page 26, line 12, "said first image sensor" should be changed to -- said second image sensor--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3 and 18-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Morris et al. U.S. Patent 6,665,010.

Referring to claim 1, the Morris reference discloses in Figure 5, an image sensor (digital imager 140), comprising a sensor array comprising a two-dimensional array of pixel elements (e.g., array of pixel sensing units 118, see Col. 3, lines 8-10), said sensor array outputting digital signals as pixel data representing an image of a scene, said pixel elements comprising a first group of photodetectors (group 113a) having a first sensitivity level and a second group of photodetectors (group 113b) having a second sensitivity level (e.g., the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39); wherein said first group of photodetectors generates said output signals after a first exposure time (integration duration) and said second group of photodetectors generates said output signals after a second exposure time, said first exposure time and said second exposure time being within a snapshot of said scene (e.g., take a snapshot of an image during the normal mode, see Col. 7, lines 9-10) and said first exposure time being different than said second exposure time (e.g., the imager 140 **independently** sets the duration of the integration interval that is used by each group 113, so the exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113, See Col. 3, lines 15-29).

Referring to claim 2, the Morris reference discloses wherein said second sensitivity level is lower than said first sensitivity level and said second exposure time is longer than said first exposure time (e.g., if second group captures a dark portion of optical image and first group captures a brighter portion of the optical image, the second group sensitivity level is lower than the first group sensitivity level, and the second group exposure time is longer than the first group exposure time, see Col. 3, lines 22-29).

Referring to claim 3, the Morris reference discloses wherein said first group of photodetectors (e.g., 113a is associated with a red pixel color) is disposed to capture a first color spectrum of visible light and said second group of photodetectors (e.g., 113b is associated with a green pixel color) is disposed to capture a second and different color spectrum of visible light (See Col. 3, lines 36-40).

Referring to claim 18, the Morris reference discloses in Figure 5, an image system (digital imager 140, see Col. 3, lines 8-10), comprising a first image sensor (the image sensor in the first group 113a) having a first sensitivity level, said first image sensor generating output signals representing an image of a scene; and a second image sensor (the image sensor in the second group 113b) having a second sensitivity level, said second image sensor generating output signals representing an image of a scene (e.g., the image sensor in the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39); wherein said first image sensor generates said output signals after a first exposure time (integration duration) and said second image sensor generates said output signals after a second exposure time, said first exposure time and said

second exposure time being within a snapshot of said scene (e.g., take a snapshot of an image during the normal mode, see Col. 7, lines 9-10) and said first exposure time being different than said second exposure time (e.g., the imager 140 **independently** sets the duration of the integration interval that is used by each group 113, so the exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113, See Col. 3, lines 15-29).

Referring to claim 19, the Morris reference discloses in Figure 5, a method for generating electrical signals representing an image in an image sensor, said image sensor (digital imager 140 has array of pixel sensing units 118, see Col. 3, lines 8-10) comprising a first group of photodetectors (group 113a) having a first sensitivity level and a second group of photodetectors (group 113b) having a second sensitivity level (e.g., the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39); generating output signals as pixel data indicative of a light intensity (brightness) impinging on said first group of photodetector in said first group of photo detectors (e.g., the first group 113a outputs a signals indicative of light intensity associating with a first portion of optical image); and generating output signals as pixel data indicative of a light intensity (brightness) impinging on said second group of photodetectors (e.g., the second group 113b outputs a signals indicative of light intensity associating with a second portion of optical image); at a second exposure time different than said first exposure time and within said snapshot of said scene (e.g., take a snapshot of an image during the normal mode, see Col. 7, lines 9-10), said pixel data being associated with each

photodetector in said second group of photodetectors (e.g., the imager 140 **independently** sets the duration of the integration interval that is used by each group 113, so the exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113, See Col. 3, lines 15-29).

Referring to claim 20, the Morris reference discloses wherein said second sensitivity level is lower than said first sensitivity level and said second exposure time is longer than said first exposure time (e.g., if second group captures a dark portion of optical image and first group captures a brighter portion of the optical image, the second group sensitivity level is lower than the first group sensitivity level, and the second group exposure time is longer than the first group exposure time, see Col. 3, lines 22-29).

Referring to claim 21, the Morris reference discloses wherein said first group of photodetectors (e.g., 113a is associated with a red pixel color) is disposed to capture a first color spectrum of visible light and said second group of photodetectors (e.g., 113b is associated with a green pixel color) is disposed to capture a second and different color spectrum of visible light (See Col. 3, lines 36-40).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Tani U.S. Patent 5,187,569.

Referring to claim 4, the Morris reference discloses all subject matter as discussed with respected to claim 1, except that the Morris reference does not explicitly show using a two dimensional array of selectively transmissive filters superimposed and in registration with each of said pixel elements, and the selectively transmissive filters includes a first group of filters associated with a first color of visible light and a second group of filter associated with a second color of visible light.

The Tani reference teaches in Figures 7-8, a two dimensional array of selectively transmissive filters (e.g., the primary color filters as shown in Figure 8, which only red light, green light and blue light can be transmitted; and the complementary color filters as shown in Figure 7, only Yellow light, cyan light and magenta light can be transmitted, see Col. 1, lines 41-50) in registration with each of said pixel elements, said array of selectively transmissive filters includes a first group of filters associated with said first group of photodetectors for capturing said first group of photodetectors for capturing said first color spectrum of visible light (red color) and a second group of filters associated with said second group of photodetectors for capturing said second color spectrum of visible light (green color). The Tani reference is evidence that one of ordinary skill in the art at the time to see more advantages the digital camera system using a two dimensional array of selectively transmissive filters superimposed and in registration with each of the pixel elements so that the digital camera be able to senses a color image from the interested object easily. For that reason, it would have been obvious one having ordinary skill in the art at the time of the

invention was made to see the image sensor of Morris using a two dimensional array of selectively transmissive filters superimposed and in registration with each of said pixel elements, and the selectively transmissive filters includes a first group of filters associated with a first color of visible light and a second group of filter associated with a second color of visible light as taught by Tani.

Referring to claim 5, the Morris and Tani references disclose all subject matter as discussed with respected to claim 4, and the Morris reference discloses wherein said array of pixel elements further comprises a third group of photodetectors (group 113c) having a third sensitivity level (e.g., the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39; the group 113c may be associated with a blue color when using a primary color filters as disclosed in the Tani reference), said third group of photodetectors generating said output signals after a third exposure time different than said first and said second exposure times (e.g., the imager 140 independently sets the exposure time of each group based on the sensitivity level of each group).

Referring to claim 6, the Morris and Tani references disclose all subject matter as discussed with respected to claim 5, and Tani reference discloses wherein said first, second and third groups of photodetectors are disposed to capture a red, green and blue color spectrum respectively (e.g., by using the primary color filters as shown in Figure 8, see Col. 1, lines 45-49).

Referring to claim 7, the Morris and Tani references disclose all subject matter as discussed with respected to claim 5, and Tani reference discloses wherein said first, second and third groups of photodetectors are disposed to capture a cyan, magenta and yellow color spectrum respectively (e.g., by using the complementary color filters as shown in Figure 7, only Yellow light, cyan light and magenta light can be transmitted, see Col. 1, lines 41-45).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Fowler et al. U.S. Patent 5,461,425.

Referring to claim 8, the Morris reference discloses all subject matter as discussed with respected to claim 1, except that the Morris reference does not explicitly show a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements.

The Fowler reference teaches in Figure 1, a image sensor comprising a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements, each of said ADC circuits being connected to one photodetector for converting said output signal to a digitized pixel voltage signal (See Col. 2, lines 47-59). The Fowler reference is evidence that one of ordinary skill in the art at the time to see more advantages the image sensor including a plurality of analog-to-digital converter connected at the output of each pixel elements so that the image sensor can suppress the parasitic effects and significantly increase of the signal-to-noise ration of the image information (See Col. 1, lines 40-51). For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing a plurality of analog-

to-digital conversion (ADC) circuits located within said array of pixel elements as taught by Fowler.

8. Claims 9, 12-13, 16-17 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Yoneyama J.P. Publication 04-313949.

Referring to claim 9, the Morris reference discloses in Figure 5, an image sensor (digital imager 140), comprising a sensor array comprising a two-dimensional array of pixel elements (e.g., array of pixel sensing units 118, see Col. 3, lines 8-10), said sensor array outputting digital signals as pixel data representing an image of a scene, said pixel elements comprising a first group of photodetectors (group 113a) having a first sensitivity level and a second group of photodetectors (group 113b) having a second sensitivity level (e.g., the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39). However, the Morris reference does not explicitly disclose the sensor array (140) generating multiple representations of said image at a plurality of exposure times.

The Yoneyama reference teaches in Figures 1-6, an image sensor device comprising: a sensor array (image sensor 11, see page 7, [0012]) comprising a plurality of pixel (light interception) elements, said sensor array outputting digital signals as pixel data representing an image of a scene and said sensor array generating multiple representations of said image at a plurality of exposure times (See, page 5, [0008]); a data memory includes a pixel data memory (14) and a time index memory (15); a pixel data memory (14, see page 7, [0011]), in

communication with said sensor array (11), for storing said pixel data for each of said pixel elements (see page 9, [0015], lines 16-17), a time index memory (count memory 15, see page 8, [0012], lines 5-8), in communication with said sensor array, for storing a time index value for each of said pixel elements in said sensor array, said time index value indicating a respective one of said plurality of exposure times (the number of readouts for each picture element) when said pixel data of a respective pixel element exceeds said predetermined threshold level and for which said pixel data is stored. The Yoneyama reference is evidence that one of ordinary skill in the art at the time to see more advantages the image sensor generating multiple representations of said image at a plurality of exposure times and having a data memory for storing a time index value and pixel data so that the image sensor can obtain a wide dynamic range without being restricted by the dynamic range of light interception element of image sensor (See, page 5, [0007]).

For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing the image sensor generating multiple representations of said image at a plurality of exposure times and having a data memory for storing a time index value and pixel data as taught by Yoneyama; and the groups 113 of Morris associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, therefore plurality of exposure times comprises a first set of exposure times and a second set of exposure times, said first group of photodetectors (e.g., group 113a) generates said multiple representations of said image at said first set of exposure times, and said second group of photodetectors (e.g., group 113b) generates said multiple

representations of said image at said second set of exposure times, said first set of exposure times and said second set of exposure times being within a snapshot of said scene and said first set of exposure times including at least one exposure time different than said second set of exposure times (e.g., the imager 140 independently sets the duration of the integration interval that is used by each group 113, so the set of exposure times as disclosed in the Yoneyama reference that including at least one exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113, See Col. 3, lines 15-29).

Referring to claim 12, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, and wherein said second sensitivity level is lower than said first sensitivity level, and a last exposure time in said second set of exposure times is longer than a last exposure time of said first set of exposure times (e.g., if second group captures a dark portion of optical image and first group captures a brighter portion of the optical image, the second group sensitivity level is lower than the first group sensitivity level, and the second group exposure time is longer than the first group exposure time, see Col. 3, lines 22-29; and while the image sensor generating multiple representations of said image at a plurality of exposure times as disclosed in the Yoneyama reference).

Referring to claim 13, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, and the Morris reference discloses wherein said first group of photodetectors (e.g., 113a is associated with a red pixel color) is disposed to capture a first color spectrum of visible light and said second group of photodetectors (e.g., 113b is

associated with a green pixel color) is disposed to capture a second and different color spectrum of visible light (See Col. 3, lines 36-40).

Referring to claim 16, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, and the Morris and Yoneyama references disclose wherein the exposure times within said first set of exposure times (for the first group 113a) are spaced apart in a non-linear manner (e.g., the Yoneyama reference discloses the exposure times of each sensor element is in non-linear meaner based on sensitivity level, because the imager sensor element associates with low sensitivity level that the signal is weak and has longer accumulation period with more number exposure times disclosed in the Yoneyama reference, and the Morris's image sensor 140 independently sets the duration of the integration interval that is used by each group 113, so the set of exposure times including at least one exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113 in a non-linear manner, See Col. 3, lines 15-29).

Referring to claim 17, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, and the Morris and Yoneyama references disclose wherein the exposure times within said second set of exposure times (for the second group 113a) are spaced apart in a non-linear manner (e.g., the Yoneyama reference discloses the exposure times of each sensor element is in non-linear meaner based on sensitivity level, because the imager sensor element associates with low sensitivity level the signal is weak and has longer accumulation period with more number exposure times disclosed in the Yoneyama reference, and the Morris's image sensor 140 independently sets the duration of the integration interval that is used by each group 113, so the set of exposure times including

at least one exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113 in a non-linear manner, See Col. 3, lines 15-29).

Referring to claim 22, the Morris reference discloses in Figure 5, a method for generating electrical signals representing an image in an digital image sensor, said digital image sensor (digital imager 140 has array of pixel sensing units 118, see Col. 3, lines 8-10) comprising a first group of photodetectors (group 113a) having a first sensitivity level and a second group of photodetectors (group 113b) having a second sensitivity level (e.g., the groups 113 associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, see Col. 3, lines 20-21, lines 30-31 and lines 37-39). However, the Morris reference does not explicitly disclose groups (113) of the sensor array (140) generating digital signals as pixel data indicative of a light intensity impinging on the groups of photodetectors at a plurality of exposure times within a snapshot of a scene.

The Yoneyama reference teaches in Figures 1-6, an image sensor device comprising: a sensor array (image sensor 11, see page 7, [0012]) comprising a plurality of pixel (light interception) elements, said sensor array outputting digital signals as pixel data indicative of a light intensity impinging on the photodetectors of the image sensor array at a plurality of exposure times within a snapshot of a scene (See, page 5, [0008]); a data memory includes a pixel data memory (14) and a time index memory (15); a pixel data memory (14, see page 7, [0011]), in communication with said sensor array (11), for storing said pixel data for each of said pixel elements (see page 9, [0015], lines 16-17), a time index memory (count memory 15, see page 8, [0012], lines 5-8), in communication with said sensor array, for storing a time

index value for each of said pixel elements in said sensor array, said time index value indicating a respective one of said plurality of exposure times (the number of readouts for each picture element) when said pixel data of a respective pixel element exceeds said predetermined threshold level and for which said pixel data is stored. The Yoneyama reference is evidence that one of ordinary skill in the art at the time to see more advantages the image sensor generating digital signals as pixel data indicative of a light intensity impinging on the photodetectors of the image sensor array at a plurality of exposure times within a snapshot of a scene and having a data memory for storing a time index value and pixel data so that the image sensor can obtain a wide dynamic range without being restricted by the dynamic range of light interception element of image sensor (See, page 5, [0007]).

For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing the image sensor generating digital signals as pixel data indicative of a light intensity impinging on the groups of photodetectors at a plurality of exposure times within a snapshot of a scene and having a data memory for storing a time index value and pixel data as taught by Yoneyama; and the groups 113 of Morris's image sensor associated with different sensitivity level, such as different pixel colors sensed by array, different characteristics of the array or different portion of the optical image, therefore generating output signals as pixel data indicative of a light intensity (brightness) impinging on said first group of photodetector in said first group of photo detectors (e.g., the first group 113a outputs a signals indicative of light intensity associating with a first portion of optical image) at a first plurality of exposure times within a snapshot of a scene (e.g., take a snapshot of an image during the normal mode, see Col. 7,

lines 9-10); and generating output signals as pixel data indicative of a light intensity (brightness) impinging on said second group of photodetectors (e.g., the second group 113b outputs a signals indicative of light intensity associating with a second portion of optical image) at a first plurality of exposure times within a snapshot of a scene, storing in a data memory a time index value and said pixel data for each photodetectors in said first group (113a) and said second group of photodetectors (113b), said time index value indicating one of said first and second plurality of exposure times in which said pixel data exceeds a predetermined threshold level and for which said pixel data is stored (e.g., the imager 140 independently sets the duration of the integration interval that is used by each group 113, so the set of exposure times including at least one exposure time of each different group 113 is different corresponding to the different sensitivity level of each group 113, See Col. 3, lines 15-29).

Referring to claim 23, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 22, and the Morris reference discloses wherein said second sensitivity level is lower than said first sensitivity level and said second exposure time is longer than said first exposure time (e.g., if second group captures a dark portion of optical image and first group captures a brighter portion of the optical image, the second group sensitivity level is lower than the first group sensitivity level, and the second group exposure time is longer than the first group exposure time, see Col. 3, lines 22-29).

Referring to claim 24, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 22, and the Morris reference discloses wherein said first group of photodetectors (e.g., 113a is associated with a red pixel color) is disposed to capture

a first color spectrum of visible light and said second group of photodetectors (e.g., 113b is associated with a green pixel color) is disposed to capture a second and different color spectrum of visible light (See Col. 3, lines 36-40).

9. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Yoneyama J.P. Publication 04-313949 and Hynecek U.S. Patent 6,229,133.

Referring to claim 10, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, except that the Morris and Yoneyama references do not explicitly show the data memory are fabricated in an integrated circuit.

The Hynecek reference teaches in Figures 1-2 and 8, the two-dimensional array (40, in Figure 2) has a plurality of pixels (42-57 contain the device shown in Figure 1, see Col. 3, lines 1-14); and the data memory (26 in Figure 1, and 254 in Figure 8, see Col. 2, lines 67-68) are fabricated in an integrated circuit (an image sensor circuit) as shown in Figures 1-4. The Hynecek reference is evidence that one of ordinary skill in the art at the time to see more advantages has a data memory fabricated in an integrated circuit so that the image sensor is a two-dimensional array so that the sensor array is more compact and easy to store any data information efficiently for late image process operation. For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing the data memory are fabricated in an integrated circuit as taught by Hynecek.

Referring to claim 11, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, except that the Morris and Yoneyama references do not explicitly show data memory stores a threshold indicator value for each of the pixel elements indicating whether said pixel data for each of said pixel elements has exceeded said predetermined threshold level.

The Hynecek reference teaches in Figures 1-2 and 8, the two-dimensional array (40, in Figure 2) has a plurality of pixels (42-57 contain the device shown in Figure 1, see Col. 3, lines 1-14); the each of the pixel has a comparator circuit comprising a comparator (24 in Figure 1, 252 in Figure 8) for comparing if any pixel data associated with a pixel element exceed a predetermined threshold value (V_{REF}) and a threshold memory (26 in Figure 1, 254 in Figure 8), for storing a threshold flag (comparison result) for each of the pixel elements, the threshold flag having a first value (a digital "one", see Col. 2, 64-65, and "high" state, see Col. 5, lines 54-55) when said pixel data associated with a pixel element exceeds a predetermined threshold value and having a second value (a digital "zero", and "low" state, see Col. 5, lines 50-52) when said pixel data does not exceed the predetermined threshold value. The Hynecek reference is evidence that one of ordinary skill in the art at the time to see more advantages has a memory associates with comparator so that the comparison result (threshold flag) can be using for late image process operation; and the image sensor is a two-dimensional array so that the sensor array is more compact and easy to access. For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing data memory stores a threshold indicator value for each of the pixel elements indicating whether said pixel data for

each of said pixel elements has exceeded said predetermined threshold level as taught by Hynecek.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Yoneyama J.P. Publication 04-313949 and Tani U.S. Patent 5,187,569.

Referring to claim 14, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 13, except that the Morris and Yoneyama references do not explicitly show using a two dimensional array of selectively transmissive filters superimposed and in registration with each of said pixel elements, and the selectively transmissive filters includes a first group of filters associated with a first color of visible light and a second group of filter associated with a second color of visible light.

The Tani reference teaches in Figures 7-8, a two dimensional array of selectively transmissive filters (primary color filters as shown in Figure 8, which only red light, green light and blue light can be transmitted; or complementary color filters as shown in Figure 7, only Yellow light, cyan light and magenta light can be transmitted, see Col. 1, lines 41-50) in registration with each of said pixel elements, said array of selectively transmissive filters includes a first group of filters associated with said first group of photodetectors for capturing said first group of photodetectors for capturing said first color spectrum of visible light (red color) and a second group of filters associated with said second group of photodetectors for capturing said second color spectrum of visible light (green color). The Tani reference is evidence that one of ordinary skill in the art at the time to see more advantages the digital

camera system using a two dimensional array of selectively transmissive filters superimposed and in registration with each of the pixel elements so that the digital camera be able to senses a color image from the interested object easily. For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to see the image sensor of Morris using a two dimensional array of selectively transmissive filters superimposed and in registration with each of said pixel elements, and the selectively transmissive filters includes a first group of filters associated with a first color of visible light and a second group of filter associated with a second color of visible light as taught by Tani.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. U.S. Patent 6,665,010 in view of Yoneyama J.P. Publication 04-313949 and Fowler et al. U.S. Patent 5,461,425.

Referring to claim 15, the Morris and Yoneyama references disclose all subject matter as discussed with respected to claim 9, except that the Morris and Yoneyama references do not explicitly show a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements.

The Fowler reference teaches in Figure 1, a image sensor comprising a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements, each of said ADC circuits being connected to one photodetector for converting said output signal to a digitized pixel voltage signal (See Col. 2, lines 47-59). The Fowler reference is evidence that one of ordinary skill in the art at the time to see more advantages the image sensor including a plurality of analog-to-digital converter connected at the output of each pixel

elements so that the image sensor can suppress the parasitic effects and significantly increase of the signal-to-noise ration of the image information (See Col. 1, lines 40-51). For that reason, it would have been obvious one having ordinary skill in the art at the time of the invention was made to modify the image sensor of Morris by providing a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements as taught by Fowler.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Sto et al. U.S 5,943,514 discloses a controller controls the quantity of light received by each of the light receivers such that each of the light receivers is either independently controlled.

b. O'Connor et al. U.S. 6,330,030 discloses a method increments a value in a counter and determines whether the photosensor voltage is less than a reference voltage.

c. Dong U.S. 5,734,426 discloses a method to control the exposure time of the array of MOS.

d. Udagawa et al. U.S. 5,237,185 discloses an image pickup apparatus comprises color separation means for separating light from a subject into a plurality of colors.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (703) 305-3250. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lin Ye
Examiner
Art Unit 2615

January 24, 2005